

REMARKS

Claims 1-2 and 5-6 are pending herein.

I. The obviousness rejections based on Tsurumi et al. (US 6,070,867) in view of Matsuda et al. (US 6,997,543).

The USPTO respectfully rejects Claims 1-5 under 35 U.S.C. § 103(a) as being obvious over Tsurumi et al. in view of Matsuda et al. Claim 1 is an independent claim and claims 3-4 have been cancelled.

A. The cited references do not teach or suggest that each of the driving gear, the first follower gear, and the second follower gear is a helical gear, as claimed in claim 1.

Claim 1 claims in relevant part:

“wherein each of the driving gear, and the first follower gear comprising the intermittent gear and the whole gear of the first follower gear, and the second follower gear is a helical gear.” (emphasis added)

No new matter is introduced by these amendments. Support for the amendments can be found in present Figure 1 and on page 8 of the present specification. Regarding these limitations, it is respectfully not seen where the cited references teach or suggest the claimed structure quoted above.

Specifically, the USPTO respectfully admits on page 2 of the specification that Tsurumi “fails to teach that the drive gear and the follower gear are helical gears, and that the second follower gear is helical over is [sic] entire surface.” The USPTO respectfully attempts to overcome this deficiency in Tsurumi by alleging that Matsuda teaches helical gears as seen in driving gear 14G and follower gear 4G5, as seen in Figure 19 of Matsuda

However, neither of these gears in Matsuda is a helical gear. As clearly seen in Figure 19 of Matsuda, gear 14G is normal spur gear. This is clearly seen because the teeth (illustrated by the lines on gear 14G) are aligned in straight lines along the longitudinal direction of gear 14G.

Thus, because driving gear 14G of Matsuda is a normal spur gear, **it logically follows that the teeth of following gear 4G5 must also be a normal spur gear.** If 4G5 were a helical gear as respectfully alleged by the USPTO, then it would be impossible to mesh spur gear teeth of gear 14G with the helical gear teeth of gear 4G5. Additionally, one can clearly see from Figure 19 of Matsuda that **gear 4G5 is a normal spur gear because of the orientation of the teeth on gear 4G5,** i.e., the teeth are arranged in straight lines along the longitudinal axis of the gear.

Furthermore, there is respectfully nothing in the specification of Matsuda that teaches or suggests that gears 14G and 4G5 are helical gears. In fact, it is respectfully important to note that **Matsuda does not even mention the term “helical” anywhere in the specification.**

Instead, the USPTO respectfully alleges that column 14, lines 34+ of Matsuda teaches that gears 14G and 4G5 are helical gears. However, **this portion of Matsuda only teaches that gear 4G5 is slantingly-sliced.** In other words, **gear 4G5 is formed by cutting a normal spur gear slantingly.** This is respectfully different from a helical gear, however, because slantingly-slicing the gear 4G5 does not change the teeth orientation from a normal spur gear to a helical gear. In other words, **the fact that gear 4G5 is slantingly sliced does not mean that gear 4G5 is a helical gear.**

Overall, it is respectfully asserted that the USPTO has made a clear technical error in alleging that gears 14G and 4G5 are helical gears. **Figure 19 of Matsuda clearly shows these gears are normal spur gears,** and **there is respectfully nothing in the specification that teaches or suggest they are helical gears.**

In contrast, present Figure 1 illustrates one possible embodiment of the claimed structure quoted above. Specifically, present Figure 1 shows driving gear 1, first follower gear 2, and second follower gear 3. **One can clearly see that gears 1, 2, and 3 are helical gears because the teeth (illustrated by the lines) wrap around the surface of the gear.** In contrast, as seen in Figure 19 of Matsuda, the teeth of gear 14G, for example, are configured in straight lines in a longitudinal direction along the gears' surface. Thus, there is a clear

technical difference between the normal spur gears taught in Matsuda and the helical gears claimed in claim 1.

The claimed structure quoted above is important and non-trivial because it provides significant **inherent** advantages over conventional devices. For example, as noted on page 2 of the present specification, the use of a helical gear with an intermittent gear **reduces shock sounds when gears transfer from disengagement state at the toothless portion to an engagement state.** Additionally, **the claimed structure reduces wear and breakage of the gear teeth.**

Thus, it is respectfully asserted that the cited references, taken either alone or in combination, do not disclose all the limitations of claim 1. Therefore, it is respectfully asserted that claim 1 is not obvious over the cited references.

B. Additional explanation.

Applicants also respectfully submit the following additional explanation distinguishing the cited references from the claimed apparatus.

In Matsuda, there is disclosed a slantingly-sliced gear which is formed by cutting a gear slantingly in order to form a tooth-omitted portion. However, the slantingly-sliced gear is formed by simply cutting a normal gear slantingly, which results in a gear having teeth over an entire circumferential surface and is different from the intermittent gear having a toothless portion.

In contrast, the apparatus claimed in claim 1 has a new structure in which a helical gear is applied to an intermittent gear having a toothless portion, thereby producing the advantages described above. Furthermore, there is no reason to combine the teachings of Tsurumi and Matsuda with respect to the objects or the structures thereof. Thus, it is respectfully asserted that claim 1 is allowable over the cited references.

C. The dependent claims.

As noted above, it is respectfully asserted that independent claim 1 is allowable, and therefore it is further respectfully asserted that dependent claims 2 and 5-6 are also allowable.

II. Conclusion.

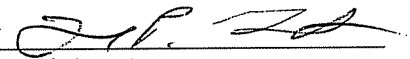
Reconsideration and allowance of all of the claims is respectfully requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Please contact the undersigned for any reason. Applicants seek to cooperate with the Examiner including via telephone if convenient for the Examiner.

Respectfully submitted,

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